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CLAIMS

1. (Currently amended) A system for creating a combinatorial coating library, comprising:

a plurality of coating materials suitable for forming at least one coating layer;

a controller operable for controlling quantities of the plurality of coating materials;

a mixer operable for mixing the plurality of coating materials;

one or more substrate comprising a plurality of predefined regions operable for receiving the plurality of coatings;

a coating system operable for delivering the plurality of materials to the substrate either incrementally or continuously;

~~a spatial mask;~~

a curing system operable for providing a plurality of curing environments;

~~a thermal gradient curing element;~~

a spatial mask disposed between the curing system and the substrate, the spatial mask comprising a variable transmissivity for a curing medium produced by the curing system; and

a testing device;

wherein the combinatorial coating library comprises a predetermined combination of at least one of the plurality of coating materials and at least one of the plurality of curing environments associated with each of the plurality of predefined regions~~; and~~

~~wherein the thermal gradient curing element has a constant or variable temperature distribution along a dimension of the thermal gradient curing element~~.

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2. (Original) The system of claim 1, wherein th curing system is operable to apply substantially the same predetermined one of the plurality of curing environments to each of the plurality of regions associated with the at least one coating layer of the one or more substrates.

3. (Original) The system of claim 1, wherein the curing system is operable to apply a substantially different predetermined one of the plurality of curing environments to each of the plurality of regions associated with the at least one coating layer of the one or more substrates.

4. (Previously Presented) The system of claim 1, wherein the plurality of materials further comprise a material selected from the group consisting of polymeric materials and oligomeric materials.

5. (Original) The system of claim 1, wherein the coating system further comprises a coating system selected from the group consisting of a spray/vapor coating system, spin coating system, dip coating system, flow coating system, and draw-down coating system.

6-16. (Cancelled)

17. (Previously Presented) A system for creating a combinatorial coating library, comprising:

a coating system operatively coupled to at least one of a plurality of materials suitable for forming at least one coating layer on a surface of one or more substrates; and

a curing system operative to apply at least one of a plurality of curing environments simultaneously to each of a plurality of regions associated with the at least one coating layer, wherein the plurality of curing environments include a curing environment selected from the group consisting of thermal radiation, ultraviolet radiation, visible radiation, microwave radiation, electron beam radiation, laser radiation, and humidity, the curing system comprising a spatial mask having an elongate surface positioned between a curing source and the at least one coating layer, wherein a radiation transmission characteristic varies along a dimension of the elongate surface of the spatial mask; and

a thermal gradient heating element for providing continuous or variable heat across the one or more substrates;

wherein the combinatorial coating library comprises a predetermined combination of at least one of the plurality of materials and at least one of the plurality of curing environments associated with each of the plurality of regions.

18. (Previously Presented) The system of claim 17, wherein the coating system further comprises a coating system selected from the group consisting of a spray and vapor coating system, spin coating system, dip coating system, flow coating system, and draw-down coating system.

19. (Previously Presented) The system of claim 17, wherein said coating system further comprises a dip-coating apparatus having a plurality of substrate holders and a corresponding plurality of wells, the plurality of substrate holders and the plurality of wells relatively positionable to immerse a plurality of substrates secured by the plurality of substrate holders within at least one of the plurality of materials disposed within the plurality of wells.

20. (Original) The system of claim 19, further comprising a plurality of substrates each secured by one of the plurality of substrate holders, each of the plurality of substrates comprising an acoustic wave transducer having a first acoustic wave parameter and a second acoustic wave parameter, the first acoustic wave parameter corresponding to a first amount of coating or viscoelastic property of the coating layer, the second acoustic wave parameter corresponding to a second amount of coating or viscoelastic property of the coating layer.

21. (Previously Presented) The system of claim 17, wherein each of the plurality of curing environments comprises one of a plurality of curing sources and one of a plurality of curing characteristics, wherein the curing system is operable to apply substantially the same curing source in combination with a substantially different predetermined one of the plurality of curing characteristics to each region associated with the coating layer.

22. (Previously Presented) The system of claim 17, wherein each of the plurality of curing environments comprises one of a plurality of curing sources and one of a plurality of curing characteristics, wherein the curing system is operable to apply a substantially different curing source in combination with a substantially different predetermined one of the plurality of curing characteristics to each region associated with the coating layer.

23. (Previously Presented) The system of claim 17, wherein one of the plurality of curing environments associated with at least one coating layer further comprises a scanning mirror system having a mirrored surface positionable relative to an incoming radiation beam, wherein the mirrored surface is positionable to direct the incoming radiation beam to a selected one of the plurality of regions associated with the coating layer.

24. (Previously Presented) The system of claim 17, wherein one of the plurality of curing environments associated with at least one coating layer further comprises a plurality of waveguides each having a first end corresponding to one of the plurality of regions associated with the coating layer and a second end associated with a curing source.

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25. (Previously Presented) The system of claim 17, wherein one of the plurality of curing environments associated with at least one coating layer further comprises a heating source in thermal communication with an elongate heating element operably positionable adjacent to the plurality of substrates, wherein the elongate heating element has a modulated heat transmissibility characteristic.

26. (Original) A system for creating a combinatorial coating library, comprising:

a plurality of substrates each secured by one of a plurality of substrate holders, each of the plurality of substrates comprising an acoustic wave transducer having a first acoustic wave parameter and a second acoustic wave parameter, the first acoustic wave parameter corresponding to a first amount of coating or viscoelastic property of a coating layer on the substrate, the second acoustic wave parameter corresponding to a second amount of coating or viscoelastic property of the coating layer on the substrate;

a coating system operatively coupled to at least one of a plurality of materials for forming a coating layer on a surface of each of the plurality of substrates, the coating system comprising a dip-coating apparatus having a plurality of substrate holders and a corresponding plurality of wells, the plurality of substrate holders and the plurality of wells relatively positionable to immerse the plurality of substrates secured by the plurality of substrate holders within at least one of the plurality of materials disposed within the plurality of wells; and

a curing system operative to apply at least one of a plurality of curing environments to each of a plurality of regions associated with the coating layer;

wherein the combinatorial coating library comprises a predetermined combination of at least one of the plurality of materials and at least one of the plurality of curing environments associated with each of the plurality of regions.

27. (Withdrawn) The system of claim 1, wherein the coating system further comprises

a plurality of substrate holders having a mount for securing each of the plurality of substrates, the plurality of substrate holders each rotatable about a spin axis substantially perpendicular to the surface of each of the plurality of substrates; and

a delivery mechanism operatively coupled to each of the plurality of materials such that at least one of the plurality of materials is deliverable to each of the plurality of substrates.

28. (Withdrawn) The system of claim 27, wherein each of the plurality of substrate holders has a different spin axis.

29. (Withdrawn) The system of claim 27, wherein each of the plurality of substrate holders has the same spin axis.

30. (Withdrawn) The system of claim 1, further comprising a plurality of deposition mechanisms operatively coupled to at least one of the plurality of materials, each of the plurality of deposition mechanisms having a delivery source movable from a first position substantially aligned with the spin axis to a second position substantially positioned away from the spin axis, each delivery source operable in the first position to deliver droplets of the respective material onto the surface of the substrate.

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31. (Withdrawn) A system for creating a combinatorial coating library, comprising:

a coating system operatively coupled to at least one of a plurality of materials suitable for forming at least one coating layer on a surface of each of a plurality of substrates, the coating system comprising:

a plurality of substrate holders having a mount for securing each of the plurality of substrates, the plurality of substrate holders each rotatable about a spin axis substantially perpendicular to the surface of each of the plurality of substrates;

a delivery mechanism operatively coupled to each of the plurality of materials such that at least one of the plurality of materials is deliverable to each of the plurality of substrates; and

a curing system operative to apply at least one of a plurality of curing environments to each coating layer associated with each of the plurality of substrates, wherein the plurality of curing environments include a curing source selected from the group consisting of thermal radiation, ultraviolet radiation, visible radiation, microwave radiation, electron beam radiation, laser radiation, and humidity;

wherein the combinatorial coating library comprises a predetermined combination of at least one of the plurality of materials and at least one of the plurality of curing environments associated with each of the plurality of substrates.

32. (Cancelled)

33. (Withdrawn) Th system of claim 35, further comprising:

a plurality of coating applicators forming the coating system, each of the plurality of coating applicators having a supply inlet and a coating head, each supply inlet fluidly coupled to at least one of the plurality of materials, and each coating head defining an elongate distribution channel having a length corresponding to a width of the substrate, each coating head further positioned at a suitable distance adjacent to the surface of the substrate for dispensing a layer of at least one of the plurality of materials onto the substrate;

a plurality of curing stations forming the curing system, each of the plurality of curing stations associated with and positioned adjacent to a corresponding one of the plurality of coating applicators to form a coating and curing zone; and

a holding structure having a securing mechanism operative to hold the substrate and movably position the substrate between and within each of the plurality of coating and curing zones, the holding structure movable within each of the plurality of coating and curing zones from a first position adjacent to a respective one of the plurality of coating applicators to a second position adjacent to a respective one of the plurality of curing stations to operatively form a multi-layer coating defining the coating library.

34. (Cancelled)

35. (Withdrawn) A system for creating a combinatorial coating library, comprising:

a coating system operatively coupled to at least one of a plurality of materials for forming at least one coating layer on a surface of a substrate; and

a curing system operative to apply at least one of a plurality of curing environments to each of a plurality of regions associated with the coating layer;

wherein the combinatorial coating library comprises a predetermined combination of at least one of the plurality of materials and at least one of the plurality of curing environments associated with each of the plurality of regions.

36-42. (Cancelled)

43. (Withdrawn) The method of claim 45, wherein the plurality of curing environments include a curing environment selected from the group consisting of thermal radiation, ultraviolet radiation, visible radiation, microwave radiation, electron beam radiation, laser radiation, and humidity.

44. (Cancelled)

45. (Withdrawn) A method for creating a combinatorial coating library, comprising:

selectively depositing at least one of a plurality of materials onto a surface of each of a plurality of substrates;

rotating each of the plurality of substrates about a spin axis to form a respective plurality of coating layers;

selectively applying at least one curing environment to each of the plurality of coating layers; and

combining selected ones of the plurality of materials and the plurality of curing environments associated with each of the plurality of coating layers for each of the plurality of substrates to form the coating library.

46. (Cancelled)

47. (Withdrawn) The method of claim 49, wherein the depositing of the at least one material further comprises projecting droplets of the at least one material onto the surface of the plurality of substrates through at least one of a plurality of deposition mechanisms.

48. (Cancelled)

49. (Withdrawn) The method of claim 51, further comprising the step of sequentially depositing the at least one coating layer and applying the at least one of the plurality of curing environments to form a multi-layer coating, wherein each sequence of the combination of depositing and applying comprises a coating/curing sequence selected from a plurality of coating/curing sequences.

50. (Withdrawn) The method of claim 52, wherein the depositing of the at least one of the plurality of materials further comprises the step of delivering a substantially continuous liquid flow of the at least one of the plurality of materials to the surface of the substrate through one or more coating applicators, each of the plurality of coating applicators having a supply inlet and a coating head, each supply inlet fluidly coupled to at least one of the plurality of materials, and each coating head defining an elongate distribution channel having a length corresponding to a width of the substrate, each coating head further positioned at a suitable distance adjacent to the surface of the substrate for dispensing a layer of at least one of the plurality of materials onto the substrate.

51. (Withdrawn) The method of claim 52, wherein the depositing of the at least one of the plurality of materials further comprises the step of projecting dispersed droplets of at least one of the plurality of materials onto the surface of the substrate through at least one of a plurality of delivery mechanisms.